

Type	Fungicide
Controls	Fungi - like black spot and powdery mildew.
Mode of Action	These oils smother fungal growth and reduce spore germination (Reference 3).

Thurston County Review Summary:

Washington State Department of Agriculture (WSDA) uses the name "petroleum oil" to include; mineral oil, mineral seal oil, white mineral oil (EPA OPP Chemical Code 063502), BVA Spray 13, paraffin oil (EPA OPP Chemical Code 063503), aliphatic petroleum solvent, Amsco 140, natural gasoline, paraffinic hydrocarbons, petroleum distillate, oils, solvent, hydrocarbons, Sunspray 11N, Sunspray 6N, and Sunspray 8N. The EPA does not have any active ingredients registered under the name "petroleum oil" but does register the active ingredient "aliphatic solvent" to include; mineral oils (EPA OPP Chemical Code 063502) and aliphatic petroleum hydrocarbons (EPA OPP Chemical Code 063503). Chemicals included in the aliphatic solvents group (EPA OPP Chemical Code 063502) are; mineral oil (CAS# 8012-95-1), white mineral oil (petroleum - CAS# 8042-47-5), lubricating oils (petroleum C15-30, hydrotreated neutral oil - CAS#'s 72623-84-8 and 72623-86-0), lubricating oils (petroleum C20-50, hydrotreated neutral oil-based - CAS# 72623-87-1), distillates (petroleum, solvent refined light paraffinic - CAS# 64742-55-8), distillates (petroleum, solvent-dewaxed light paraffinic - CAS# 64742-56-9), and distillates (petroleum, solvent-dewaxed heavy paraffinic - CAS# 64742-65-0). Chemicals included in the aliphatic petroleum hydrocarbons (EPA OPP Chemical Code 063503) group are; mineral oil (hydrocarbon oils or paraffin liquid - CAS# 8020-83-5), distillates (petroleum, solvent refined light paraffinic - CAS# 64741-89-5), distillates (petroleum, solvent refined heavy paraffinic - CAS#'s 64741-88-4 and 64742-54-7), as well as CAS#'s 64742-55-8, 72623-84-8 and 8002-05-9 d (Reference 1). This review of petroleum oils encompasses those oils that are registered by the EPA under mineral oils (EPA OPP Chemical Code 063502) and aliphatic petroleum hydrocarbons (EPA OPP Chemical Code 063503). The chemicals registered by the WSDA under the name "petroleum oil" are assumed to be included within the EPA's list of mineral oils or aliphatic hydrocarbons.

Fungicides containing "petroleum oil" (as described above) as the sole active ingredient are rated moderate in hazard and are rated conditional by Thurston County's pesticide review criteria. These oils are considered a moderate hazard because toxicity testing incurred developmental toxicity without maternal toxicity.

MOBILITY

Property	Value	Reference	Value Rating
Water Solubility (mg/L)	0.001 to 0.6	1	Low
Soil Sorption (Kd=mL/g)	Value not found		
Organic Sorption (Koc=mL/g)	900 to 100,000 (10,000 average)	1	Low

Mobility Summary:

Because this review encompasses many different petroleum oils, the physical and chemical properties are also different. But, these oils are all poorly soluble in water and are expected to bind well to soil and vegetation. The overall hazard for these oils to move off the site of application with rain or irrigation water is rated low.

PERSISTENCE

Property	Value	Reference	Value Rating
Vapor Pressure (mm Hg)	0.0001 to 0.000000000000001	1	Moderate to high
Biotic or Aerobic Half-life (days)	65	2	High
Abiotic Half-life (days)	Not degraded by sun or water	1	High
Terrestrial Field Test Half-life (days)	Value not found		
Hydrolysis Half-life (days)	Stable	1	High
Anaerobic Half-life (days)	Value not found		
Aquatic Field Test Half-life (days)	<2 - 3	1	Low

Persistence Summary:

Some of the petroleum oils have higher vapor pressures and are more likely to dissipate into the air after an application than others. These oils are not susceptible to breakdown with interaction with water (hydrolysis) and are not expected to be degraded by sunlight. In general, petroleum oils are likely to take over 60 days to biodegrade to half of the applied concentrations and are rated high in hazard for chemical persistence.

BIOACCUMULATION

Property	Value	Reference	Value Rating
Bioaccumulation Factor	Value not found		
Bioconcentration Factor	Value not found		
Octanol/Water Partition Coefficient	log Kow = 5-20	1	High

Bioaccumulation Summary:

Testing with mineral oils and aliphatic petroleum hydrocarbons indicates that they are poorly absorbed when ingested, inhaled, or from skin contact. After ingestion these oils are quickly eliminated, unchanged and not metabolized, from the body (up to 98% within 4 days). Although the octanol/water partition coefficient for petroleum oils indicates that they would bind very well to fish or animal tissue, metabolism studies show that they do not get absorbed and accumulate. The hazard for bioaccumulation is rated low.

ACUTE WILDLIFE TOXICITY VALUES and Risk Assessment

Test Subject	Value	Reference	Value Rating
Mammalian (LD50)	>28,000 mg/kg	1	Low
Avian (LD50)	>2,250 mg/kg bw	1	Low
Honey bee or insect (LD50)	1,474 ug/bee	2	Low
Annelida -worms (LC50)	750 mg/kg	2	Moderate
Fish (LC50)	>500,000 mg/L	1	Low
Crustacean (LC50)	0.9 mg/L or >14 mg/L	1	Inconclusive
Mollusk (LC50)	6 mg/L (toxic - not lethal)	1	Moderate
Amphibian (LD50 or LC50)	Value not found		

Acute Toxicity Testing and Ecotoxicity Summary:

Single-dose toxicity testing with these petroleum oils indicates that they are low in toxicity to animals, birds, honeybees, fish but may be moderately to worms and some aquatic organisms (Reference 1). There were no treatment related effects observed to honeybees in contact studies (Reference 1). Although low in toxicity to birds, the EPA stated that oils sprayed directly on bird egg shells can result in smothering the egg and can impair hatching ability (Reference 1). The EPA did not believe that spray drift would result in adverse issue to egg hatching.

There is some ecological risk to aquatic invertebrates from direct water applications, overspray, or drift of these oils onto surface waterbodies, although there is a lot of uncertainty around the toxicity value to use for these species. In the lethal dose study all of the test species (daphnia magna) were floating and trapped within the oil film, but not dead. This and other studies make it difficult to establish a dose of concern for aquatic organisms. So, although the toxicity is somewhat uncertain, there is a potential to entrap small aquatic organisms when pesticidal oils are applied intentionally for mosquito larvae control.

ACUTE HUMAN TOXICITY - Risk Assessment

Subject and Scenario	Route	Dose of Concern	Exposure	Margin of Safety	Reference	Value Rating
EPA waived risk assessments for pesticide uses						
EPA waived risk assessments for pesticide uses						
EPA waived risk assessments for pesticide uses						
EPA waived risk assessments for pesticide uses						

Acute Toxicity Risk Assessment Summary:

Regarding the risk from oral exposures the EPA stated: "The overall dietary exposure, and the drinking water (only) dietary exposure, have also each been qualitatively assessed, based on the absence of acute and chronic oral effects from exposures to mineral oils and aliphatic petroleum hydrocarbons. These dietary exposures are not of concern to the Agency, nor does the Agency have concerns for the aggregate exposures to these chemicals." (Reference 1). Aggregate exposures include all potential oral, inhalation and skin contact exposures combined. Since the potential combined exposures (which includes all crop and residential exposures) are below the EPA's level of concern, then the risk without crop and drinking water inputs would be much smaller and rated low in hazard.

CHRONIC HUMAN TOXICITY HAZARDS

Property	Value	Adverse Effect	Reference	Rating
Carcinogenicity	Group 3	Not classifiable as to its carcinogenicity (human)	1	Low
Mutagenicity	es not reported	Non-mutagenic	1	Low
Neurotoxicity - (NOAEL)	Value not found			
Endocrine Disruption	Value not found			
Developmental Toxicity (NOAEL)	900-4,500 mg/kg bw	Fetal malformations	1	Moderate
Reproductive Toxicity (NOAEL)	900-4,500 mg/kg bw	Fetal malformations	1	Moderate
Chronic Toxicity (NOAEL)	900-4,500 mg/kg bw	Fetal malformations	1	Check risk

Chronic Toxicity Hazard Summary:

Various materials (oils) were tested and determined to be non-mutagenic (Reference 1). Highly refined oils are categorized as Group 3 - not classifiable as to their carcinogenic potential in humans (Reference 1). The EPA stated that they have no evidence that the aliphatic solvents are associated with endocrine disruption (Reference 1).

When evaluating petroleum oils for potential for reproductive and developmental toxicity, there were some effects that suggest that fetal toxicity can occur at doses without maternal toxicity. The EPA concluded that the very high doses used in the toxicity tests were so much higher than those expected from pesticidal uses that there are no concerns for potential sensitivity of infant and children to mineral oils and aliphatic petroleum hydrocarbons (Reference 1). Thurston County pesticide review system typically rates reproductive or developmental toxicity without maternal toxicity as high in hazard but since the EPA has determined that the concentrations that toxicity was observed was much greater than those expected from pesticidal use that the hazard is rated moderate.

CHRONIC HUMAN TOXICITY - Risk Assessment

Subject and Scenario	Route	Dose of Concern	Exposure	Margin of Safety	Reference	Value Rating
EPA waived risk assessments for pesticide uses						
EPA waived risk assessments for pesticide uses						
EPA waived risk assessments for pesticide uses						
EPA waived risk assessments for pesticide uses						

Chronic Toxicity Risk Assessment Summary:

The EPA determined that due to the low toxicity of aliphatic solvents (both mineral oils and aliphatic petroleum hydrocarbons) that there is no need to require a risk assessment for potential dermal, inhalation, indoor, outdoor, or occupational exposures (Reference 1). The hazard of human toxicity from potential long-term exposures to highly refined mineral oils and liphatic petroleum hydrocarbons from pesticidal use is rated low.

Metabolites and Degradation Products:

Information about the degradation of the various petroleum oils could not be found.

Comments:

In a summary of toxicity studies with representative aliphatic solvents it was determined that they are potentially irritating to eyes (EPA Toxicity Category III), slightly irritating to skin (EPA Toxicity Category IV) but not skin sensitizers (Reference 1).

References

- USEPA. Office of Pesticide Programs, Special Review and Reregistration Division. Revised Reregistration Eligibility Decision, Exposure and Risk Assessment on Lower Risk Pesticide Chemicals. CASE: Aliphatic Solvents (3004). Active Ingredients: Mineral Oil (063502) & Aliphatic Petroleum Hydrocarbons (063503). Revised: November 29, 2007.
- International Union of Pure & Applied Chemistry. Pesticide Properties Database. Paraffin oil (C18-C30) [1, not ASU] (Ref: ASU 70 480 1). Data accessed 12/27/2012.
- Carlos E. Bográn, Scott Ludwig and Bradley Metz. Texas A&M University Department of Entomology. "Using Oils as Pesticides". November 2006